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The cost of prescription medicines to patients

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Abstract

The study compares the cost-sharing (co-payment) arrangements for prescribed medicines in a sample of EU countries. Through a set of typical prescription scenarios, the cost burden to individual patients of prescriptions are examined, in the context of drug price, and from the perspective of therapeutic need. The cost to patients of medicines is consistently lower in some, and higher in other, countries, regardless of the type of prescription charge system. Fixed charge systems, as opposed to graduated co-payment systems, are obviously more likely to lead to similar charges for the treatment of comparable clinical conditions, but depending on the level of the charge, can result in the patient paying a higher charge than the price of the drug to the health organisation. Exemption from charges for prescription medicines, commonly relate to clinical condition and level of income. Some systems also have age-related criteria and apply ceilings to the total prescription cost burden borne by the patient. The impact on patient costs of specific policy formulations is discussed and a

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proposal is made for cost convergence for comparable therapies. The method used in this study may also provide a route for investigating model systems prior to implementation.

Keywords: Pharmaceuticals; Prescription drugs; Co-payment; Cost-sharing; Prescription charges; Drug use

1. Introduction

The cost of health care, and particularly the cost of prescription medicines, present major challenges to public expenditure policies. EU Member states have adopted a diverse range of approaches to cost-containment of pharmaceuticals on both demand and supply sides. The prices of prescription medicines vary greatly between countries, but policies common to most, are systems for cost sharing the financial burden with consumers.

Burstall [1] argues that the purpose of prescription co-payments or charges is to restrain public spending on medicines, and there is a considerable body of evidence, particularly from the UK and USA, that shows the demand for prescription medicines is reduced by a direct financial contribution from the patient [2]. It is therefore important to formulate pharmaceutical reimbursement policies that do not jeopardize patients' needs.

Grootendorst [3] has shown that the onset of insurance cover for medicines was associated with an increase in drug utilisation, concentrated among patients with lower health status. Further, Stuart and Grana [4] in charting the impact of annual income of an elderly population on their medication rates, have demonstrated those in the lowest groups ($<$ \$6000) were 25% less likely to medicate a given health problem than those in the top groups ($>$ \$18 000). EU Member States therefore commonly have age and low income as grounds for exemption from cost-sharing arrangements for prescription medicines.

Most evaluations of co-payment systems [5–10] have concentrated on overall price elasticity, i.e. the impact of increases in patient contribution on the overall uptake of prescription medicines. However, recently it has been shown that price elasticity can vary markedly between different therapeutic groups of drugs [4,11], raising concern about whether changes in cost-sharing arrangements affect the uptake of both essential and non-essential drugs similarly [12]. Countries which have adopted new co-payment systems more recently, have been particularly keen to explore their impact on the uptake of essential medicines in the evaluation of their systems [13,14]. Under the recently introduced Swedish system, some 20% of households have attempted to attenuate the cost burden of prescription drugs. The most commonly prescribed drugs where uptake was reduced by the implementation of the new co-payment arrangements were those for asthma, allergy, pain, gastrointestinal ulcers and skin disorders. The greater the number of items prescribed, the more marked the reduction in uptake. The scheme has had the greatest impact on those on disability pensions or long-term sick leave, those with larger families (three or four children), single parents, students and the unemployed [14].

This study differs from previous ones exploring prescription charge or reimbursement policies which have taken a system or population approach in a single country or health insurance scheme. This international survey determines the cost of prescribed medication at the level of the individual patient. The approach that has been taken is to develop scenarios of hypothetical profiles of patients requiring drug therapy for the treatment of common clinical conditions.

The purpose of the current study is to explore the cost to patients, in a sample of EU member states, of prescribed medication with a view to identifying:

1. factors determining the patient costs of prescribed medication and whether any trends are discernible between different types of cost-sharing schemes and/or different countries;
2. the patient costs of comparable regimens of drug therapy;
3. means of reducing the prescription cost burden to patients
4. issues for consideration in the formulation of cost-sharing policies for prescription medicines.

2. Methods

The first challenge was to select for study a variety of prescription charge plans that reflected the diversity of systems within the EU. As a starting point, we selected the countries in which members were based of an existing EU funded-network, the Evaluation Network of Drug Expenditure and Policy (ENDEP), which included a range of fixed charge and graduated payment systems, and a variety of exemption and compensatory mechanisms. The patient charge systems in the following countries are described: Austria, Denmark, Finland, France, Germany, Italy, Netherlands and the UK.

To explore the impact of the various systems on the cost burden of prescribed medication at the level of the individual patient, a set of 20 scenarios was devised and piloted, each of which included a prescription for one or more products to treat a common uncomplicated clinical condition — either acute, episodic or chronic. The scenarios cover a typical range of domestic and social circumstances of patients requiring treatment from primary care physicians. They do not include scenarios of elderly patients, who commonly suffer from multiple pathologies that require more complex drug regimens, and can be eligible for exemptions on a variety of grounds — age, income, clinical conditions, or have reached ceilings for prescription charges. Their exclusion from this study does not suggest that either the cost of drugs to the elderly population is unimportant, or that it does not represent the major cost burden for prescribed medication in EU countries, but rather that for the purposes of this study their inclusion in the test scenarios would complicate and 'distort' the findings.

A limitation of the scenarios is that they do not incorporate any financial details, such as gross income, disposable assets, or receipts of social or welfare benefits or subsidies. These are important because prescription charges may be waived in different countries, on the basis of low income or receipt of welfare benefits. The

assumptions made in these scenarios are that such exemptions do not apply. The assumption is also made that within the scenarios, patients are subject to standard charges, and that they have not reached prescription charge ceilings, in countries where they apply, e.g. Germany. The absence of an income dimension to the scenarios means that exploration of the Dutch system was limited to its description, since the cost of prescription medicines at or below the reference price, are not shared with individuals below a certain income, and for those above, the co-payment system depends on the health insurance scheme purchased.

Although prescribing behaviour varies between individual physicians, and national prescribing patterns differ significantly, for the purposes of this study it is necessary to exclude differences in costs arising from variations in prescribing practices. Therefore the prescriptions within the scenarios are standardised and based on contemporary UK therapeutic practice, and the products involved are those licensed for use by the UK medicines regulatory authorities, and described in the British National Formulary [15]. They include products prescribed by the brand name of a particular manufacturer — and identified in the scenarios by inverted commas — and those prescribed generically by their approved names.

Dispensing controls also vary across the countries included in the study. In many countries, pharmacists are required to supply medicines in original packs and to dispense the number that most closely covers the number of dose units prescribed, whereas in UK, the exact number of dose units prescribed is dispensed. Some EU countries limit prescribing and dispensing to branded products, e.g. France. Pack sizes also vary between countries, as well as the available strengths of products. Normal dispensing conventions in complying with prescribers' instructions were assumed in each of the respective countries.

The prices of the prescribed medicines were derived from the standard prices listed in editions, current in July 1996, of appropriate publications in each country, i.e. Index of Medicines — Main Association of the Austrian Social Security (Austria); Drug Tariff (Finland); Red List of the Federal Association of Pharmaceutical Industry (Germany); OEMF, L'informatore Farmaceutico (Italy); NHS List Price for branded products and Drug Tariff for generic products (UK).

No allowance was made for discounts on list prices in countries where these are formally incorporated, e.g. Italy and UK, but the standard handling charge of 0.45 ecus was included in Finnish prices. For branded products, the medicine price used in each country was that of the prescribed brand (or equivalent brand of the same manufacturer) of the equivalent strength in the same dosage form, e.g. tablet, pressured aerosol, etc; and identical or nearest equivalent pack size. For generic prescriptions, the medicine price used was the price of the lowest cost product listed of the approved drug name, of an equivalent strength in the same dosage form and of the same or nearest equivalent pack size.

The patient charges were calculated by applying the prescription charge system operated in the respective countries, to products and packs that would normally be supplied by a dispensing pharmacist, in each country, in filling the prescriptions in the scenarios.

In the event, in 10 of the 20 scenarios developed, the products prescribed were unavailable in more than two of the countries surveyed or there was sufficient uncertainty about the comparability of products between countries for reliable inclusion in the study. Details of the individual prescription scenarios included in the study are provided in Appendix A.

The survey of medicine prices and patient costs, using the ten standard prescription scenarios was undertaken in six of the countries in July 1996, and in Denmark, in October 1996. The Netherlands was not surveyed for the reasons explained above. The monetary values associated with prices and costs in each country were converted to ecus (now euros), using exchange rates listed in the 16 October 1996 edition of The Financial Times. A comprehensive list of the prices of prescribed medication associated with each of the scenarios is provided in Appendix B, and similarly a comprehensive list of patient costs in given in Appendix C.

3. Cost sharing schemes for prescription medicines in Europe

Table 1 provides details of the main features of prescription charge systems in eight EU member states. Three countries were included as examples of fixed price systems, i.e. Austria, Germany, UK. The UK is the simplest and easiest to administer, with a flat rate charge per item. Austria has a fixed rate per pack, and therefore the patient co-payment burden depends on the number of packs dispensed. Germany has three levels of co-payment depending on the pack sizes — small, medium and large — and so the total co-payment payable is dependant on the size of the packs and the number of each pack size dispensed. Three countries — France, Denmark and Italy — have graduated systems, based on the designated therapeutic status of individual products. In France patients pay, either 0, 35 or 65% of the cost of the prescribed products and in Denmark patients pay either 0, 25 or 50% of the cost of the medicines prescribed. Italy also has a graduated system — 0, 50 and 100%, but other than for products in 100% band, a fixed prescription charge per pack is also levied, similar to Austria. In Finland patients are normally liable for the first 8.7 ecus of their prescription charge and refunded 50% of the cost above this deductible. For patients with serious long-term illness, the deductible is halved, and the refund is either 75 or 100% of the prescription cost. In the Netherlands, prescription drugs are available under the public health system free of charge providing their price does not exceed the reference price. In 1996, an average of 0.6 ecus per public insured person was paid to cover the cost of prescription drugs above the reference price system.

Alongside different systems of cost sharing, there is a diverse range of exemptions. Exemption status may be gained from prescription charges or co-payments on the basis of age, income, or clinical conditions. In some countries, the majority of the population, are exempt. In UK, 85% of NHS prescription items — provided to over half the population are exempt from charges on the grounds of age (Scenario 5 and 9), income or clinical condition (Scenario 7). Extensive scope for exemption exists in France according to clinical condition. There is provision for

Table 1
Prescription charge arrangements within public health systems (July 1996)

Country	Type of charge	Patient charge (ecus)	Deductible	Grounds for exemption	Ceiling on patient charge	Refund/compensation system
Austria	Fixed	3.15 per pack	No	Disease state; low income	No	
Denmark[a]	Graduated	0; 25; 50% of drug cost	No	No	No	For low income patients, through counties
Finland[b]	Graduated above a fixed cost deductible	0, 25%; 50% of drug cost above deductible	8.7 ecus is standard deductible; a deductible of 4.35 ecus applies in serious long-term illness		553 ecus in a year	Low income patients can apply for full refund through municipality
France	Graduated	0; 35; 65% of drug cost	No	31 disease states; low income	No	'Mutuelle' complementary coverage
Germany	Fixed	1.56, 2.60, 3.64 depending on pack size	No	Children up to 18 years; low income	2% of income generally, but 1% for chronically ill patients	No
Italy	Graduated plus fixed charge	0, 50% of direct cost plus 1.57 per pack or full cost	No	Age; disability; disease state; low income	No	No
Netherlands	No charge for annual income below 23 180 ecus	Zero unless drug price is above reference price system, when patient pays difference	–	–	–	–
UK	Fixed	7.04 per item	No	Age, disease state, low income	Through pre-payment certificate at cost of 100.35 ecus annually	No

[a] October 1996.
[b] In Finland, the above tariff is applied through a reimbursement system.

Table 2
Range of drug prices and patient costs (1996) for prescribed medication[a]

Prescription scenario	Drug price	Patient costs	Comments
	Min–max (ecus)	Min–max (ecus)	
Scenario 1	3.62(UK)–11.03(D)[b]	1.56(D)–9.15(FL)	German price the highest, but the lowest cost to the patient. Finnish cost is highest to patient
Scenario 2	1.05(I)–10.21(DK)	1.20(F)–10.21(DK)	French, German patients pay the lowest; Danish, British pay the most. Only case where Finnish are not one of the highest
Scenario 3	0.71(UK)–25.96(D)	2.38(F)–9.68(FL)	British patients pay one of the highest costs with the lowest price, French Italian, German patients have the lowest costs
Scenario 4			
Product not available in France and Italy	4.20 (UK)–12.48(D)	2.60(D)–8.89(FL)	German price the highest, but the lowest cost to the patient; highest cost to Finnish patients. British patients pay more than the price
Scenario 5	2.76(UK)–22.0 FL)	0(UK)–8.77(FL)	UK, French, Italian, German patients pay less. Finnish pay the highest
Scenario 6	8.49(F)–16.80(A)	1.57(I)–12.14(FL)	Cost divergence much larger than price divergence. British patients do not benefit from lower prices
Scenario 7	1.17(UK)–37.35(D)	0(UK)–13.54 (FL)	UK, French, Italian, German patients pay less. Austrian, Danish similar
Scenario 8	28.44 (F)–126.03(D)	6.24(D)–22.06(DK)	Germany highest price but lowest cost to the patient. Low price countries do not benefit the consumer. Danish and Finnish patients pay the most
Scenario 9	33.32(I)–129.33(FL)	0(D/UK)–35.60(FL)	Patients are exempt on grounds of age in Germany and UK. Patient cost low in Italy. Price of both products, and cost to patient highest in Finland

[a] A, Austria; D, Germany; DK, Denmark; F, France; FL, Finland; I, Italy; UK, United Kingdom.

[b] In parenthesis, are given the symbols of the European countries where the price or the cost to the patient is the lowest (Minimum) or the highest (Maximum) for the seven countries.

exemption under 31 diseases, which require the prescriber's declaration (e.g. Scenario 10).

In Germany, exemptions can also be obtained on the basis of age (Scenario 9), and income: less than 10 600 ecus for singles, 14 400 ecus for couples annually. In Netherlands, there is no charge for prescribed medicines (costing no more than the reference price) under the compulsory sick fund scheme for employees and families who earn less than 23 180 ecus annually.

Several countries also have systems which cap the amount an individual has to pay for prescribed medicines in a year: In Finland, this is 553 ecus, whereas in Germany, total liability is limited to 2% of total income, and for chronically ill patients, 1%. In UK, pre-payment certificates can be purchased for 4- and 12-month periods, relieving holders of any further charges for prescriptions, regardless of the amount of medicines prescribed.

For low income patients, both Denmark and Finland have schemes whereby the costs of prescription medicines may be refunded by local municipal authorities.

In France, the cost burden of prescription co-payments is reduced through a widespread system of complementary insurance coverage called 'Mutuelles', which compensate the individual for costs associated with prescription medicines.

4. Results

Table 2 records the range of drug prices and patient costs for scenarios 1–9. (Scenario 10 is analysed in more detail in Table 3.) For both ranges, it indicates the

Table 3
Drug prices and patient costs of quadruple therapy for post-infarct patient (Scenario 10)

(a) Total prescription cost	Minimum list price (ecus)	Cost to patient (ecus)	Charge as % of costs
Austria	51.79	12.60	24
Denmark	79.40	23.72	30
Finland	61.83	35.27[a]	57
France	47.93	0	0
Germany	64.99	12.48	19
Italy	57.67	10.99	19
UK	39.59	28.16	71
(b) Individual prescription products	Minimum list price (ecus) Mean	Range	% of drug price borne by patient
'Capoten'	17.3	(10.67–31.57)	0–58
Frusemide	4.1	(0.25–7.78)	0–2816
'Zocor'	32.4	(23.41–40.39)	0–51
Acetysalicylic Acid	3.7	(2.41–4.83)	0–292

[a] Assuming all four items in the prescription were purchased at the same time. If they were purchased individually the total cost would be 43.86 ecus.

countries with the minimum and maximum values for each prescription scenario and comment is provided on the comparable patient costs of each scenario in different countries, and on any notable observations between drug cost and patient charge.

There are wide divergences both in drug prices and patient costs for the selected prescription scenarios (Table 2, Appendices B and C). For some scenarios, the price divergence is larger than the cost divergence but in other cases the divergence in patient cost is even larger than the price divergence. Countries with very high prices — Germany is often listed as the highest priced country out of the seven — do not necessarily translate into high cost countries for the consumer. On the contrary, in several scenarios (e.g. 1 and 8) German prices are the highest but the costs to the patient are the lowest.

British patients face in several scenarios (e.g. 1, 3 and 4) a very peculiar situation, since the drug prices are the lowest of the seven countries, but the British patient pays more than the price and sometimes amongst the highest prices.

4.1. The patient cost of comparable drug therapies

Scenarios 1 and 2 (Fig. 1a) relate to middle-aged women in regular employment requiring medication for pain control — one for a sports injury and one for migraine. Scenarios 3 and 4 (Fig. 1(b)) involve short courses of treatment for infections in young women. Scenarios 5 and 6 (Fig. 1(c)) address long term drug therapy requirements intended to prevent serious future morbidity, i.e. cardiovascular crises and osteoporosis.

Within these illustrative six scenarios, the patient cost of prescribed medication in France, Germany and Italy is generally less than that in the other four countries, except when exemptions come into play. In France and Italy the lower patient cost is attributable to lower drug prices and in Germany because the co-payment is on average a substantially smaller proportion of the drug price. Patient costs in Finland are consistently higher than in other countries in the three sets of scenarios. In countries with a fixed charge system (e.g. Austria, Germany and UK) patient charges for comparable drug therapies are obviously more likely to be the same (see Fig. 1) whereas in other countries the cost of drugs for similar conditions are markedly different, since they reflect the prices of the prescribed products.

4.2. Multiple drug therapy

Scenario 10 — concerning a post-myocardial infarct patient — provided us with an opportunity to explore the impact of patient charge systems on multiple drug therapy in the individual patient. From a clinical viewpoint each product provides a separate and necessary component of the contemporary drug management of patients following a myocardial infarct. Each is important in preventing the occurrence of a further 'heart attack' leading to further incapacity or death. However only in Austria and UK is the cost to the patient for 1 month's treatment the same for each of the four drugs (Fig. 2). Table 3(a) demonstrates that there is

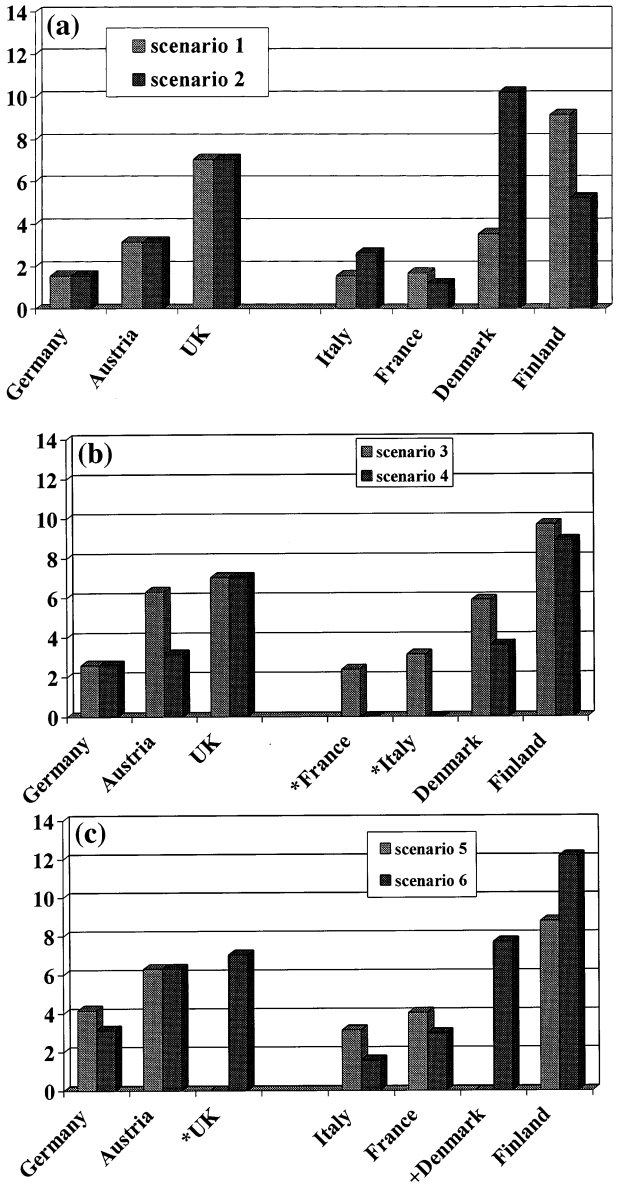

Fig. 1. Cost to patient (ecus) of prescribed medication: (a) scenarios 1 and 2. (b) scenarios 3 and 4. *Products in senario 4 not available in France or Italy. (c) scenarios 5 and 6. *within scenario 5, patients are exempt from prescription charges in the UK. $^{+}$Data not available

a greater order of diversity of patient costs than drug prices for the full prescription, and that patients in Finland and UK would bear the major share of the costs. The greater diversity of costs over prices is in fact reflected in each of the

components of the prescription (Table 3(b)), and in Italy and UK, the patient can pay significantly more than the list price. (Low-dose aspirin has been included in this scenario for illustrative purposes, and in UK at least, it is unlikely that patients would actually pay a prescription charge for this item because they would normally be advised to buy the product over-the counter from pharmacies, since the purchase price is less than the prescription charge).

5. Discussion

5.1. Determining the impact of different pharmaceutical reimbursement policies

The investigation of the differential impact of cost-sharing systems on the uptake of different therapeutic groups of prescription drugs is a recent development [4]. Policy-makers still rely on post-implementation surveys to determine the effect of new pharmaceutical reimbursement schemes on patterns of consumption of prescription medicines [13,14]. Ideally, models of cost-sharing schemes should be tested before implementation, using an evaluation instrument encompassing drugs across a wide therapeutic spectrum and patients in a variety of socio-economic circumstances. The approach adopted in this study of using patient scenarios, incorporating common clinical conditions and appropriate prescriptions, provides a start in this direction.

In pursuing this approach, the following factors are helpful to note:
Choice of clinical conditions—these need to be selected to cover a variety of well-defined conditions amenable to drug therapy, ranging from the self-limiting to the incapacitating and life-threatening, and with a comparatively high prevelance within the population under study.

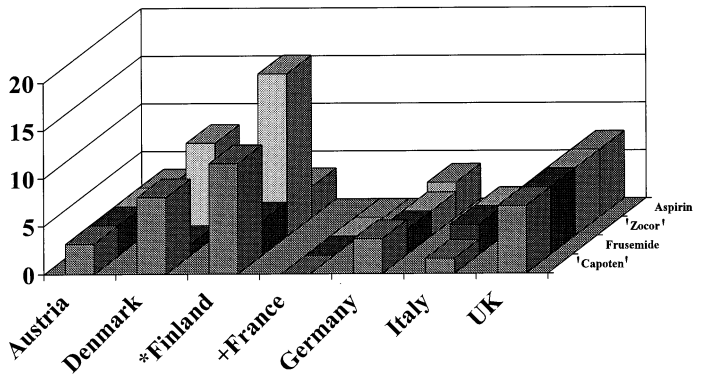

Fig. 2. Cost ecus to post-myocardial infarct patient of multiple drug regimen (scenario 10). *Assuming all 4 items were purchased simultaneously. +Within this senario, patients were exempt from prescription charges in France.

Choice of prescribed regimens—these should represent evidenced-based, currently recommended drug therapy derived from standard prescribing references and/or condition-specific consensus guidelines. Only half of the original scenarios devised for use in this current European study could in the event be used either because of the unavailability of particular products in some countries or uncertainty in the comparability of products. Therefore, in international studies it is important to devise prescription scenarios based on an awareness of consumption data of different brands, dosage forms and packs.

Socio-economic components of scenarios — scenarios need to incorporate a variety of patient ages, social circumstances and clinical histories. The scenarios in the present study were found wanting in their lack of detail on income, economic circumstances and expenditure on prescription medicines.

Specifically designed batteries of scenarios could be devised to investigate the impact of specific exemption criteria including for instance, the introduction of charge ceilings, or to consider the impact of cost-sharing schemes on particular social or disease groups.

5.2. Comparing costs and treatments

This study begins to explore the patient cost burden of comparable treatments within different national pharmaceutical pricing and cost sharing schemes. We have used the comparators of the treatment of acute infections and pain relief and also considered the patient cost of long-term medication, using antihypertensive and hormone replacement therapy (HRT) regimens as examples.

Fig. 1 confirms that the patient's cost burden for prescription medicines is consistently lower in some countries than in others. It also shows that patient costs of comparable drug treatment regimens are more likely to be similar within fixed charge systems.

Other recent studies [4,11] have considered both the importance of patient income and type of therapy on the impact of patient charges on uptake of prescribed medicines. A retrospective study of elderly beneficiaries of the Pennsylvania Medicare programme [4] demonstrated that not only were those with the lowest income level least likely to medicate, but there was a significant differential price elasticity across different therapeutic groups (presumably) based on patients' perceptions of therapeutic importance.

The significance of our findings in the context of these two studies is that patients are likely to make decisions about paying for, and therefore using prescribed medicines, on the basis of their own economic circumstances, the cost burden of prescribed medication, and their judgement of the clinical benefit of the individual drugs prescribed. Therefore, in a situation where composite drug therapy is deemed clinically necessary (Fig. 2 and Table 3), patients in modest financial circumstances may well be selective in the prescription drugs they use on the basis of the cheapest and their — rather than the clinician's —perception of the most important.

5.3. Patient costs

This study does not pretend to draw clear conclusions about pharmaceutical prices or patient charges for prescribed medicines in Europe since the number of scenarios is very limited and is confined to seven countries. However this series of case studies does provide a flavour of the complexity of European price structures and the diversity of the impact of prescription drug reimbursement systems. In some countries, the costs to patients of prescription medicines are consistently cheaper, and in others generally higher (see Table 2 and Fig. 1). No account has been taken in this study of the cultural factors relating to health care or its cost, or of comparable average national incomes. Although these will have some bearing, they do not affect the essence of these general observations on country-to-country variation of prescription costs in the seven EU member states.

The cost to the patient of prescribed medicines in a graduated co-payment scheme is a product of the drug cost, the co-payment banding and the designation of therapeutic groups to co-payment bands. Therefore changes to either the drug price control mechanism or to the patient co-payment system will affect the cost to the patient. Within fixed charged schemes, the price to the patient of prescribed medicines is independent of the drug cost, but the gearing between the two will be of interest to health resource managers and policy-makers, if not directly to the consumers.

Where the patient charge depends on the number of packs and/or size of the packs, prescribing decisions are pivotal, since the patient cost depends on the quantity prescribed and therefore the period of the prescription. In the graduated percentage systems, the length of the prescription is immaterial to the cost burden for long-term patients and, indeed, some countries (e.g. France and Italy) limit the period of a prescription. However, in fixed charge systems, longer prescriptions are likely to result in a lower cost burden for patients (e.g. in scenario 8 the UK patient who received his medicines in monthly, rather than three-monthly, instalments would pay three times the cost). Again in systems where a deductible is levied on each prescription (rather than each medicine), costs are minimised by purchasing all prescribed medicines together and for longer periods. There is a 24% difference in the cost to Finnish patients in purchasing all prescribed medicines in Scenario 10 together, rather than individually.

5.4. Exemptions and refunds

Exemptions and refunds are on the one hand designed to avoid or attenuate the barriers to necessary drug therapy that prescription charge systems impose. On the other, they remove any brake on consumer demand and a significant constraint on unnecessary access to medicines. In countries, such as UK, where non-prescription medicines can be prescribed under the National Health service, exemption from prescription charges provides a strong incentive to obtain them on prescription rather than purchase them directly from the pharmacy and so incur the full cost [16]. Therefore exemptions and refund systems, unless there are formulary or ‘Black

List' limitations, may lead to the national health system shouldering an unnecessary burden of minor illness in terms of drug costs and professional time.

6. Policy implications of this study

Changes in prescription charges or reimbursement arrangements in EU countries generally command extensive media coverage [17,18], but comment is usually limited to policy considerations. What is important to patients, is the effect on the cost of their prescriptions, and whether they can afford them. The use of patient scenarios provides a method to study the impact of changes to cost-sharing arrangements at the level of the individual patient, and a possible route to evaluating models of pharmaceutical reimbursement prior to implementation.

The findings of this study have the following implications for policy formulation. Evidence from earlier work [4,13] suggests that the diversity found in this study in patients' costs arising from treating the same or similar clinical conditions with different prescribed medicines, may result in patterns of consumption at odds with clinical need. A move towards convergence of patient costs, for comparable therapies, could be achieved through a combination of a reference price system for determining the price of drugs within therapeutic groups, such as currently exists in Germany and the Netherlands, with patients' contributions being determined by a graduated co-payment scheme related to the therapeutic importance of the product, such as currently exists in France.

A policy of generic prescribing within graduated co-payment schemes, would reduce the cost burden on the patient and could significantly improve the uptake of prescribed medicines, as well as achieve savings for the drugs bill.

With fixed charge schemes, policy limitations on the length of prescriptions may significantly increase the cost of prescribed medication to patients with chronic disorders.

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Appendix A. Prescription scenarios

1. A 42 year old female married teacher — who teaches history in a state-funded school for girls aged 11–18 — sprained her ankle whilst playing tennis with her neighbour outside of school hours. Her husband is a self-employed architect. Prescription: 'Synflex' two twice daily after food. Supply sufficient for 5 days.

2. A 35 year old female bus driver suffers from migraine — averaging one attack per month — for which she carries medication to use immediately at the onset of an attack. Prescription: 'Cafergot' one or two at onset of attack and up to two as required over the next 24 h. Supply 20.
3. A 23 year old single woman, who lives with her 2 year old daughter, in municipal rented accommodation, and works part-time (15 h per week) as an office cleaner has developed an acute chest infection for which she requires a course of antibiotics. Prescription: Amoxycillin 250 mg three times daily. Send sufficient for 5 days.
4. A 21 year old psychology undergraduate student who is attending a state university and is financially supported by her parents, recognises from her symptoms — which mimic those that she experienced once before 15 months ago — that she has vaginal candidiasis, for which she requires treatment. Prescription: 'Canesten I' to be used at night.
5. A 62 year old legal clerk, living with his second wife and three teenage children, has been treated for hypertension for 5 years. Prescription: Atenolol 50 mg one daily for 2 months.
6. A 50 year old non-working grandmother who lives with her 54 year old husband — who is an ex-psychiatric nurse who retired early two years ago — requires hormone replacement therapy after having a hysterectomy 4 years ago. Prescription: 'Estraderm TTS 50' one to be applied twice weekly. Supply sufficient for 1 month.
7. A 28 year old housewife, married to a factory worker, has been diagnosed as suffering from post-natal depression 10 weeks after the birth of her second child- for which antidepressant therapy is required. Now 12 weeks post partum, the dosage is being increased to a full therapeutic level. Prescription: Imipramine 25 mg two three times daily. Supply sufficient for 4 weeks.
8. A 27 year old hospital porter lives with his partner — who is a medical records clerk in the same hospital — their 3 month old son and her 3 year old son. The patient was diagnosed as suffering from mild ulcerative colitis 9 months ago for which he is now receiving routine maintenance therapy. Prescription: Sulphasalazine 500 mg four times daily. Supply sufficient for 3 months.
9. An 18 year old schoolboy — whose father is a full-time swimming instructor and coach, and mother is a part-time cashier at the local leisure centre — suffers from exercise-induced asthma, i.e. Adult Step/2, which was diagnosed 10 years ago. He requires routine maintenance therapy. Prescription: (a) 'Becotide-200' × 2. Two puffs twice daily. (b) Salbutamol inhaler. One–two puffs before exercise.
10. A 53 year old divorced male executive is recovering at home after suffering a myocardial infarct 4 weeks earlier. He is in the care of his daughter who is 25 years old, single and unemployed. Prescription: (a) 'Capoten' 12.5 mg twice daily. (b) Frusemide 40 mg once daily. (c) 'Zocor' 10 mg one at night. (d) Aspirin 75 mg two daily. Supply sufficient for 4 weeks.

Appendix B. Minimum list prices of prescription ingredients (ecus)

Prescription Scenario	Austria	Denmark	Finland	France	Germany	Italy	UK
1	9.38	7.06	9.58	4.88	11.03	5.03	3.62
2	6.35	10.21	5.22	3.44	11.44	1.05	1.14
3	12.00	11.71	10.63	6.79	25.96	7.65	0.71
4	5.22	6.47	8.89	A	12.48	A	4.21
5	16.50	B	22.00	11.49	19.00	12.52	2.76
6	16.80	15.34	15.57	8.49	16.73	13.06	9.54
7	26.33	27.14	18.36	10.10	37.35	9.01	1.17
8	93.92	87.20	72.73	28.44	126.03	43.16	29.02
9a	45.76	69.45	120.00	59.75	60.24	29.44	50.20
9b	8.44	4.70	9.33	4.70	11.49	3.88	2.16
10a	16.80	31.57	19.91	10.67	13.22	15.56	13.52
10b	6.49	4.50	4.41	2.32	7.78	2.93	0.25
10c	24.00	38.50	33.52	32.25	40.39	34.99	23.41
10d	4.50	4.83	3.99	2.69	3.60	4.19	2.41

(A) Prescription product not marketed in France and Italy.
(B) Data unavailable.

Appendix C. Cost of prescriptions to patient (ecus)

Prescription scenario	Austria	Denmark	Finland	France	Germany	Italy	UK
1	3.15	3.55	9.15	1.71	1.56	1.57	7.04
2	3.15	10.21	5.22	1.20	1.56	2.62	7.04
3	6.30	5.88	9.68	2.38	2.60	3.14	7.04
4	3.15	3.62	8.89	A	2.60	A	7.04
5	6.30	B	8.77	4.02	4.16	3.14	0
6	6.30	7.7	12.14	2.97	3.12	1.57	7.04
7	6.30	6.87	13.54	3.53	7.80	3.14	0
8	12.60	22.06	21.45	9.96	6.24	6.29	7.04
9a	6.30	17.57	35.6	20.91	0	1.57	0
9b	3.15	1.19		1.64		1.57	
10a	3.15	7.99	35.27	0	3.64	1.57	7.04
10b	3.15	1.14			2.60	3.14	7.04
10c	3.15	9.76			2.60	3.14	7.04
10d	3.15	4.83			3.64	3.14	7.04

(A) Prescription product not marketed in France and Italy.
(B) Data unavailable.

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